

An Assessment of the Impact of Land Application of Poultry Waste on Arsenic Levels in Drinking Water

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The land application of poultry waste is a common practice in poultry-producing areas of the United States. Most poultry waste generated in the U.S. contains arsenic compounds (inorganic and organic) as a result of the administration of the organoarsenical compound roxarsone. Roxarsone is permitted by the Food and Drug Administration (FDA) as a feed additive to reinforce the activity of coccidiostats, increase the rate of weight gain, and improve feed efficiency and pigmentation. A significant proportion of roxarsone administered during the lifetime of poultry is excreted in poultry waste, mostly unchanged. It is estimated that thousands of kilograms of arsenic are released into the environment each year based on the amount of litter generated by the 6–8 billion broiler chickens grown annually in the U.S. No treatment of animal wastes is currently required prior to land application.

In certain parts of the U.S., such as the Eastern shore counties of Maryland where poultry production is concentrated in a small geographic area, the annual load of arsenic via land application is estimated to be as high as 50 tons. Moreover, this region is one of the oldest homes to the poultry industry. The magnitude of arsenic potentially applied to land and the unique population attributes of this region, such as 100 percent use of groundwater, creates a unique opportunity for human exposure via drinking water.

We designed a population-based sampling scheme for collecting drinking water samples to estimate population exposure to arsenic in drinking water. The association between arsenic levels in drinking water samples and land use will be evaluated using analytical tools, such as correlation analysis. For these analyses, we are developing land use indicators from available databases, such as the United States Department of Agriculture's (USDA) National Land Cover Database. This study is part of a larger study supported by a grant from the Maryland Cigarette Restitution Fund to Johns Hopkins Bloomberg School of Public Health (with staff contributions from the U.S. Environmental Protection Agency's (U.S. EPA) National Center for Environmental Economics) to explore the relationship between low-level arsenic exposure via drinking water and certain types of cancer in the study area (a U.S. population).